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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/078,182	02/19/2002	Charles Lange	P01,0383 (H17-25172)	5447
128	7590	03/24/2004		EXAMINER
HONEYWELL INTERNATIONAL INC. 101 COLUMBIA ROAD P O BOX 2245 MORRISTOWN, NJ 07962-2245			TURNER, SAMUEL A	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 03/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/078,182	LANGE, CHARLES
	Examiner	Art Unit
	Samuel A. Turner	2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_.
- 2a) This action is FINAL.                                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 2-8 and 10-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_ is/are allowed.
- 6) Claim(s) 2-8 and 10-14 is/are rejected.
- 7) Claim(s) \_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \*    c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. ____.
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>8.21.03</u> .	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: ____.

## DETAILED ACTION

### *Information Disclosure Statement*

The information disclosure statement filed 18 April 2003 was scanned into IFW and did not include a PTO-1449. The examiner will, of course, consider the references related to this IDS if applicant can provide a copy of the PTO-1449 that was submitted. The examiner regrets this situation would suggest that in the future copies of PTO-1449's be included, in your proper request, to expedite problems due to the transition to the IFW format.

### *Claim Rejections - 35 USC § 103*

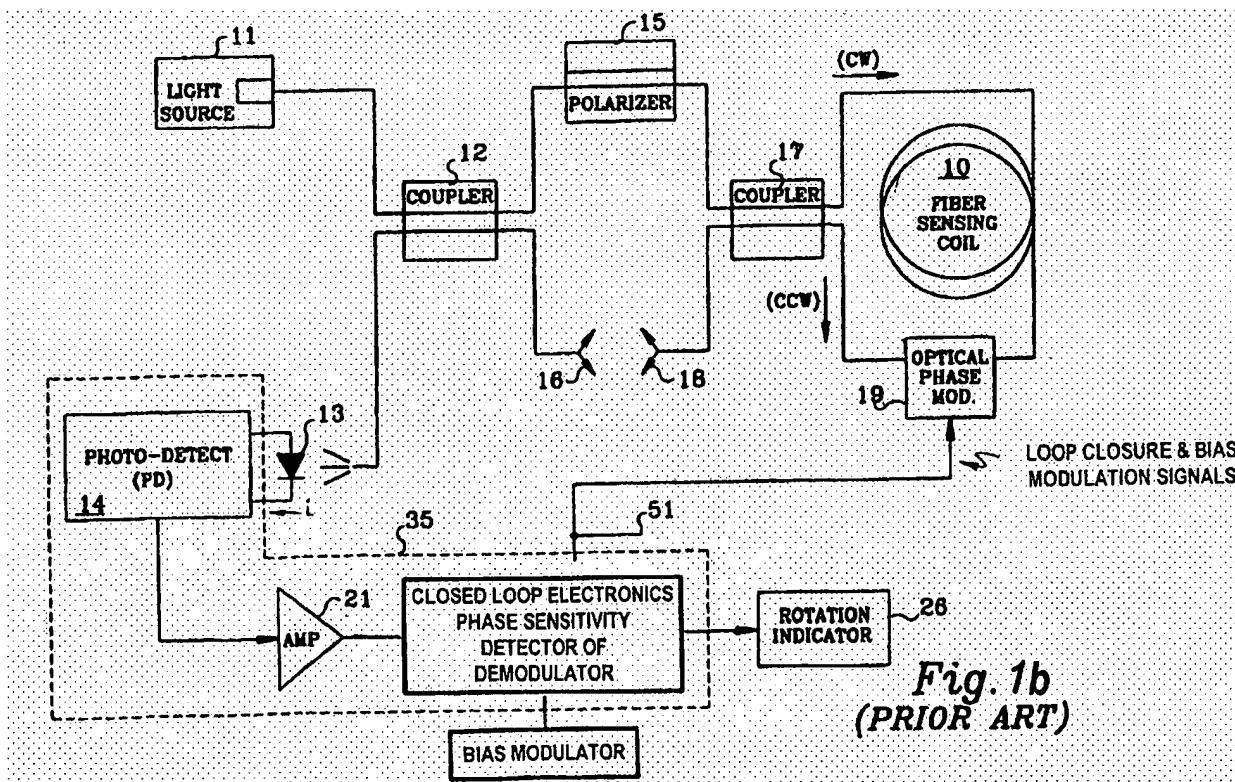
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

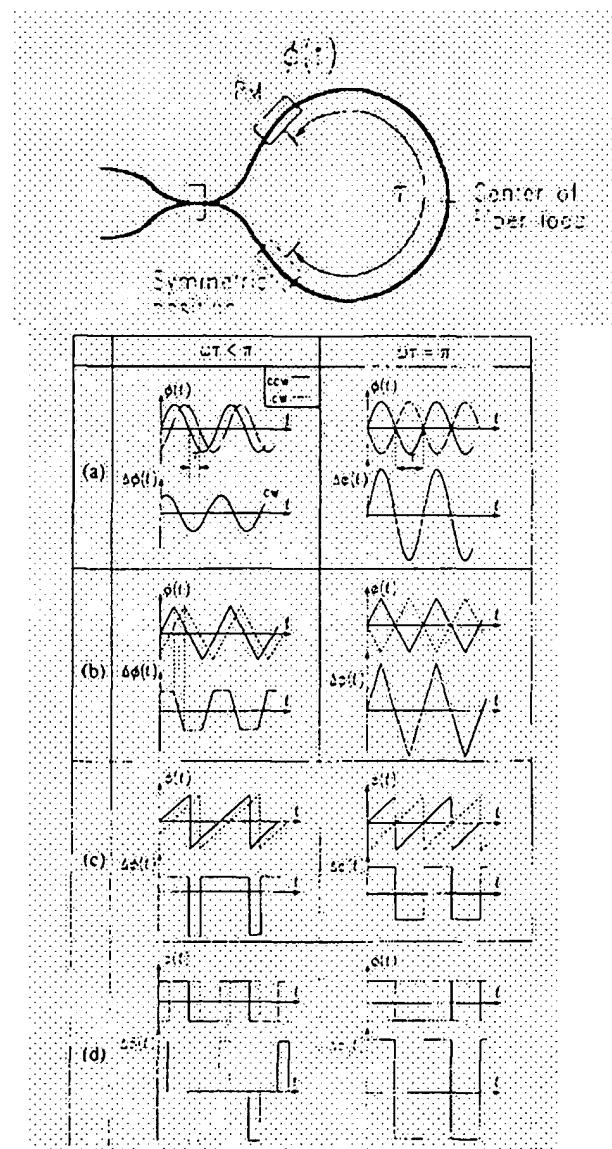
Claims 2-8, and 10-14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over applicant's prior art figure 1a in view of Udd et al(Optical Fiber Rotation Sensing).

The prior art of applicant's figure 1b teaches a well known closed loop Sagnac type fiber optic gyroscope comprising a broadband source(11), first coupler(12), polarizer(15), second coupler(17), sensing coil(10), phase modulator(19), and a phase sensitive detector(35). A bias modulator driver(20) is included to drive

the phase modulator at the proper or fundamental frequency  $f=1/2\tau$  to provide a  $\pi/2$  bias to the counter-rotating beams. The modulator is usually driven using either a sinusoidal or square waveform. The output of the synchronous demodulator(23) is used to drive a phase ramp or serrodyne waveform which is added to the bias modulator waveform. The phase sensitive detector(35) includes a photodetector(13,14), synchronous demodulator(23) which provides the gyro output. The synchronous demodulator demodulates the gyro output signal suing the bias modulation drive signal(51). Not specifically taught is a sawtooth waveform used in driving the bias modulator. By closing the loop the gyro is drive by the ramp or serrodyne waveform to a phase null point.



In the Udd text, Chapter 3 entitled "Signal Processing Techniques" written by B.Y. Kim, specific attention is directed to figure 3.6 which shows several prior art phase modulator drive signals. Included are sinusoidal(a), square(d), triangular(b), and sawtooth(c). All of these different waveforms are used to drive a fiber gyro phase modulator at the proper frequency  $f=1/2\tau$  to provide a  $\pi/2$  bias to the counter-rotating beams. Also note figure 3.5 which includes a symmetrical coupler.



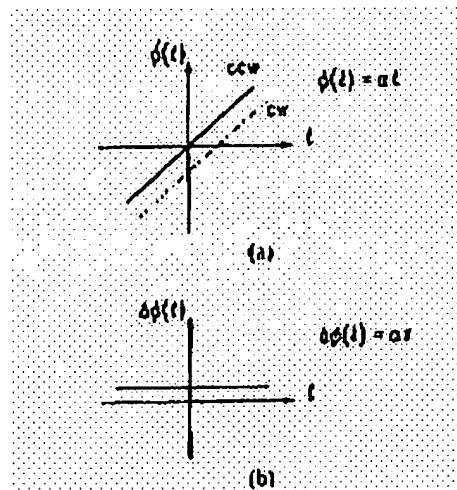
It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a closed loop to drive the gyro back to the null point of maximum sensitivity by any of the known phase modulation waveforms including a sawtooth waveform.

With regard to claims 7 and 12; it would have been obvious to one of ordinary skill in the art to use a plurality of modulators instead of combining the ramp or serrodyne waveform with the bias waveform on a single phase modulator thus the different signals can be feed to separate symmetric modulators as found in figure 3.5 of Udd.

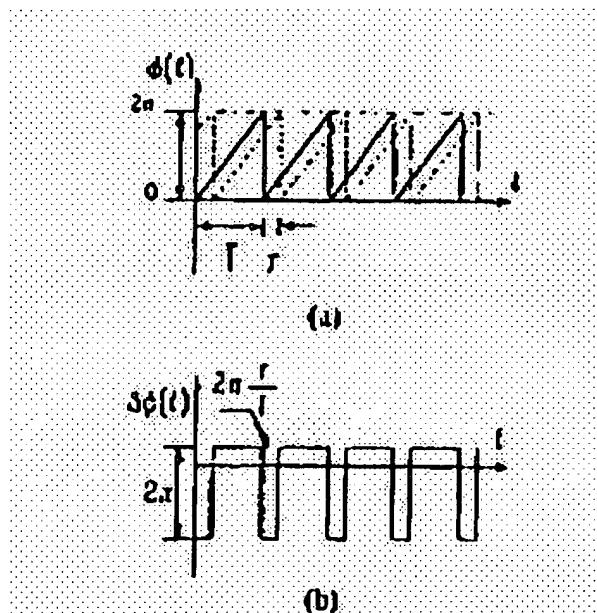
#### *Response to Arguments*

Applicant's arguments filed 15 December 2003 have been fully considered but they are not persuasive.

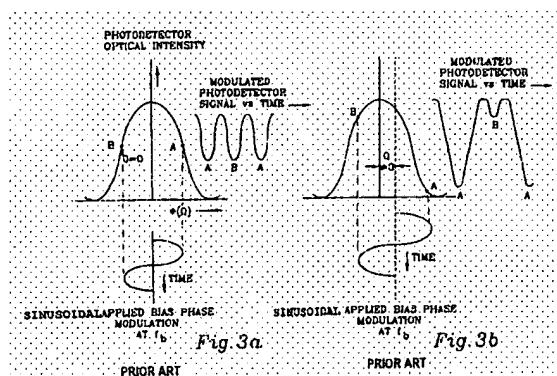
In the Kim reference, page 90, a infinite phase ramp would be the ideal signal for nulling the rotation effects of the gyro, see figure 3.9.

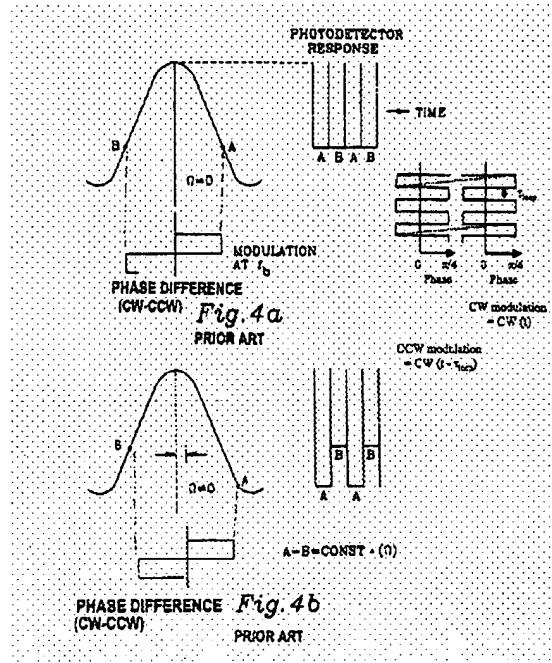


However, clearly an infinite phase ramp is impossible therefor a serrodyne or saw tooth waveform is used to null the effect of rotation. A modulation amplitude of  $2\pi$  is used so that the full waveform can be used to null the effect of rotation and will not otherwise effect the gyro output, either the period( $T$ ) or the frequency( $f=1/T$ ) can be used to control the null feedback signal see figure 3.10 and page 91.



The bias signal however, is set to produce a phase shift of  $\pm\pi/2$  to bias the gyro to its most sensitive operating point, see applicant's figures 3a, 3b, 4a, and 4b.





The summing of these two different signals, the nulling feedback signal and the bias modulation signal, at the modulation driver produces a phase shift that is not equal to integer multiples of  $2\pi$  but of  $\pm\pi/2$ . This both biases the gyro to its most sensitive operating point and nulls out the effects of rotation thus maintaining the gyro at this operating point.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory

period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel A. Turner whose phone number is **571-272-2432**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font, can be reached on **571-272-2415**.

The fax phone number for the organization where this application or proceeding is assigned is **703-872-9306**.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is **571-272-1562**.

Any other inquiry of a technical nature, and all inquiries of a general nature or any patent term adjustment should be directed to TC2800 Customer Service Office whose telephone number is **571-272-1585**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at **866-217-9197** (toll-free).



Samuel A. Turner  
Primary Examiner  
Art Unit 2877